

Data entry - Fully Optimised Car

1 Specification of the vehicle

Initial mass of vehicle - before ligh-weighing (kg)	1250
Energy consumption of vehicle per 100 km	
Litres gasoline	7.5
Litres Diesel	0
Percentage biofuel in gasoline or diesel	0%
primary energy for biofuel in MJ/l	20.1
life cycle GHG emissions for biofuel in kgCO2/l	1.46
Nm3 natural gas or LPG	0
Mass sensitive fuel consumption (%)	70%
Fuel savings (liter/100km/100kg)	0.420
Life time driving distance (km)	200,000

2 Specification of the Component

Component	motor block	
Mass of component (kg)	Aluminium 16.40	Steel 31.00
Portion of the component (%)		
...gained from aluminium sheet w/o continous heat treatment	0%	
...gained from aluminium sheet with continous heat treatment	0%	
...gained from extruded aluminium	0%	
...gained from forgings	0%	0%
...gained from castings	100%	100%
...produced from untreated flat mild steel		0%
...produced from hot-dip galvanized flat mild steel		0%
...produced from untreated long and special steel		0%
...produced from hot-dip galvanized long and special steel		0%
Percentage of indirect mass savings (%)	23%	

3 Production stage

Percentage of generated process scrap from forming and machining	5%	5%
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4 Recycled content of final component

Recycled content	Aluminium 50%	Steel 50%
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4 End-of-life stage

Recycling route	Aluminium Dismantling	Steel Dismantling
Total recycling rate	98%	95%

Results- Fully Optimised Car

1 Component information

Type of component	motor block	
Material option	Aluminium	Steel
Mass of the component (kg)	16.40	31.00
Mass difference (kg)	14.60	
Additional indirect savings	23%	
Total mass savings aluminium vs. Steel (kg)	17.96	

2 Car information

Initial car mass - before light-weighting (kg)	1250
Life time driving distance (km)	200,000
Average fuel consumption (l/100km)	7.5
Average natural gas or LPG consumption (Nm ³ /100km)	0

Fraction of fuel consumption sensitive to the car mass (%)	70%
Fuel savings (litres/100km/100kg)	0.42

3 Recycling Information

Material option	Aluminium	Steel
Recycled content of component	50%	50%
End-of-life recycling rate of component	98%	95%
Credits for end-of-life recycling	48%	45%

4 Non-renewable primary energy for the full life cycle of the component (MJ)

	Aluminium	Steel	Indirect weight equivalent	Savings (incl. use stage)	Relative savings per kg Al (incl. use stage)
Primary metal supply	1,148	392	42	713	
Recycled metal supply	46	104	11	-69	
From ingot to finished product	317	135	8	174	
Use stage	NA	NA	NA	-5,868	-358
Total (cradle to gate)	1,510	631	61	-5,050	-308
Credits for end-of-life recycling	-1,060	-260	-28	-773	
Total (life cycle)	450	371	33	-5,822	-355

5 GHG emissions (carbon footprint) for the full life cycle of the component (kg CO₂-equiv.)

	Aluminium	Steel	Indirect weight equivalent	Savings (incl. use stage)	Relative savings per kg Al (incl. use stage)
Primary metal supply	85	31	3	51	
Recycled metal supply	3	7	1	-5	
From ingot to finished product	21	9	1	11	
Use stage	NA	NA	NA	-424	-26
Total (cradle to gate)	109	47	5	-367	-22
Credits for end-of-life recycling	-79	-22	-2	-55	
Total (life cycle)	29	25	2	-422	-26